# IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA,	)
Plaintiff,	)
v.	) Case No. 05-cv-329-GKF(PJC)
TYSON FOODS, INC., et al.,	)
Defendants.	)

# STATE OF OKLAHOMA'S MOTION IN LIMINE TO PRECLUDE EXPERT TESTIMONY OF DEFENDANTS' WITNESS BRIAN MURPHY AND INTEGRATED BRIEF IN SUPPORT THEREOF

Plaintiff, the State of Oklahoma ("the State"), pursuant to Fed. R. Evid. 104 and 702 and, *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), respectfully moves this Court for an order *in limine* precluding the expert testimony of Defendants' witness Brian Murphy, Ph.D. ("Dr. Murphy") with respect to his (1) analysis and opinions derived from his "Multimedia Principle Component Analysis" (Multimedia PCA") and (2) any opinion relating to the Cargill Growers (and waste associated with Cargill operations) not having an impact on the water quality of the IRW.

## I. Introduction and Factual Background

Dr. Murphy submitted an expert report ("Report") in this matter in January, 2009. His primary objective was to review and criticize the Expert Report and opinions of Dr. Roger Olsen with respect to Dr. Olsen's Principle Component Analysis ("PCA"). *See* Exhibit A at p.8. Two of the opinions expressed in the Report involve a criticism of Dr. Olsen's PCA analysis which is discussed in section 5 of the Report, *see* Exhibit A at pp. 30-33, and an opinion that Cargill operations are not impacting waters of the IRW, *see* Exhibit A at pp. 18-22. Dr. Murphy's criticism of Dr. Olsen's PCA analysis is based on the assertion that Dr. Olsen's analysis is

incorrect, because he did the PCA analysis on water samples only. Put another way, Dr. Murphy maintains that Dr. Olsen should have employed a "Multimedia PCA" -- i.e., a PCA analysis that included poultry waste and soil samples -- in addition to the water samples. Using this logic, Dr. Murphy performed his own Multimedia PCA analysis which he uses to argue that Dr. Olsen's PCA analysis identifying sources of water contamination is flawed.

Even though Dr. Murphy criticizes Dr. Olsen's PCA analysis because Dr. Olsen did not perform a Multimedia PCA, Dr. Murphy admits that he himself had never utilized such a multimedia approach when conducting PCA in an environmental case:

- Q. And is it fair for me to understand that in the two cases prior to the present case, when you employed PCA, you did not use the multimedia PCA evaluation...?
- That's my recollection. A.

Exhibit B (Murphy Depo., 51:23-52:3). See also Id. at 165:12-21). Indeed, Dr. Murphy was unable to identify any other case where the Multimedia PCA he now advocates has been used for investigation of nutrient pollution such as the phosphorus contamination at issue in this case. See Exhibit B (Murphy Depo., 104:6-10).

Importantly, Dr. Murphy also testified that Multimedia PCA is **not** effective in identifying sources of contamination -- because the same fingerprint (or patterns between the contaminants) are not preserved from one media to another:

- Okay. So you did a separate, let's say, liquids media PCA from a solids media Q. PCA?
- Yes. A.
- Why did you not combine them together...? Q.
- A. Well, because the fingerprint isn't preserved going from one medium to another...

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Q. Do you know whether in all circumstances multimedia analysis is appropriate for PCA?

No. I would say it's not going to be very useful when the patterns between A. contaminants change from media to media because of fate and transport differences... At least it's not going to be useful for determining sources.

See Exhibit B (Murphy Depo., 49:19-50:12 & 410:3-25) (emphasis added).

Recognizing that it would not be scientifically justified to perform such a Multimedia PCA, Dr. Olsen performed his PCA analysis on water samples as one group and as solid samples as a second group. Working in this fashion, Dr. Olsen was able to identify contaminated IRW waters in relationship to the best representation of what water contaminated by poultry waste would be like, i.e., edge of field runoff samples taken from fields where poultry waste had been recently land applied. See Exhibit C (Loftis Decl. at ¶ 10). The reason Dr. Olsen did not use the Multimedia PCA analysis advocated by Dr. Murphy is because Dr. Olsen recognized that, due to chemical reactions that occur when poultry waste constituents dissolve in water, the PCA fingerprint would not be preserved from one medium (solid as waste and waste applied soil) to the next (liquid as waste is dissolved in rainwater and then infiltrates into ground water and runs off the fields).

Dr. Loftis, a Colorado State University professor who has taught at least 20 different courses on water and the environment in courses such as Environmental Statistics and Nonpoint Pollution (and who focuses his research and teaching on environmental statistics, agricultural pollution, and water quality monitoring and the environment) (See Exhibit C, Loftis Decl., ¶¶ 2-4) explains that it is scientifically unreliable to perform Dr. Murphy's Multimedia PCA to determine if the constituents that are found in poultry waste can be identified in IRW waters. Dr. Loftis explains that forms of and relationships among the poultry waste constituents change when they come in contact with rain water. A multimedia PCA analysis cannot work. See Exhibit C (Loftis Decl., ¶ 9).

Q: Did you have any mass balance information available to you for your evaluation, sir?

MS. COLLINS:

Object to form.

A: I don't recall. I certainly didn't use any mass balance information. I don't recall seeing any.

Q: Did you have any modeling information available to you, sir, that is a runoff model?

A: I suppose it was available to me in the sense that I had access to Dr. Engel's report, but it wasn't germane to what I was doing.

See Exhibit B (Murphy Depo., 221:8-19).

Second, Dr. Murphy seeks to testify that Cargill poultry waste is not contaminating ground and surface waters of the IRW. Dr. Murphy formed this opinion by examining water samples from streams and springs located on Cargill grower property. However, Dr. Murphy admits that he has no information on where poultry waste has been land applied, *see* Exhibit B (Murphy Depo., 198:19-199:22), and that to determine poultry waste impact from Cargill operations one would have to sample streams down gradient from areas that have received poultry waste. *See id.* Dr. Murphy also admits that his analysis did not include any understanding as to whether the locations he relied on were down gradient from poultry waste land application. *See* Exhibit B (Murphy Depo., 299:21-300:4). Therefore, Dr. Murphy cannot reliably opine as to whether Cargill poultry waste had an impact on the waters at the sample locations he reviewed.

# II. Legal Standard

Federal Rule of Evidence 702 provides:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Thus, "Fed. R. Evid. 702 imposes on the trial judge an important 'gate-keeping' function with regard to the admissibility of expert opinions." *Ralston v. Smith & Nephew Richards, Inc.*, 275 F.3d 965, 969 (10th Cir. 2001). As an initial matter, the court must determine the expert is qualified by "knowledge, skill, experience, training, or education" to render an opinion. *Id.* 

Next, the court must ensure that the scientific testimony being offered is "not only relevant, but reliable." *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 589 (1993).\(^1\) "To be reliable under *Daubert*, an expert's scientific testimony must be based on scientific knowledge . . . ." *Dodge v. Cotter Corp.*, 328 F.3d 1212, 1222 (10th Cir. 2003). The Supreme Court has explained that the term "scientific" "implies grounding in the methods and procedures of science." *Daubert*, 509 U.S. at 590. Likewise, it has explained that the term "knowledge" "connotes more than subjective belief or unsupported speculation." *Id.* Thus, "in order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation -- *i.e.*,, 'good grounds,' based on what is known." *Id.* 

The Supreme Court has set forth four non-exclusive factors that a court may consider in making its reliability determination: (1) whether the theory or technique can be (and has been) tested, *id.* at 593; (2) whether the theory or technique has been subjected to peer review and publication, *id.*; (3) the known or potential rate of error and the existence and maintenance of standards controlling the technique's operation, *id.* at 594; and (4) whether the theory or technique has general acceptance in the scientific community. *Id.* The inquiry is "a flexible one." *Id.*; *see also id.* at 593 ("[m]any factors will bear on the inquiry, and we do not presume to set out

The Supreme Court held in *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), that the gatekeeping function set out in *Daubert* applies not only to expert testimony based on scientific knowledge, but also expert testimony based upon technical or other specialized knowledge -- *i.e.*, it applies to all expert testimony.

a definitive checklist or test"); *Dodge*, 328 F.3d at 1222 ("the list is not exclusive"). "The focus [of the inquiry]. . . must be solely on principles and methodologies, not on the conclusions that they generate." *Daubert*, 509 U.S. at 595.

To be relevant, the testimony must "assist the trier of fact to understand the evidence or to determine a fact in issue." Fed. R. Evid. 702. This consideration has been described as one of "fit." *See Daubert*, 509 U.S. at 591. "'Fit' is not always obvious, and scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes." *Id*.

In sum, "[t]he objective of [the gatekeeping] requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire*, 526 U.S. at 152.

Finally, the party proffering the expert scientific testimony bears the burden of establishing admissibility under the Federal Rules of Evidence and *Daubert*. *See Ralston*, 275 F.3d at 970 fn. 4.

# III. Argument

As established, Dr. Murphy has himself chosen not to utilize Multimedia PCA approach prior to this case. Instead, Dr. Murphy has conducted separate PCA analysis of solids and water because "the fingerprint isn't preserved going from one medium to another..." Exhibit B (Murphy Depo., 49). This is why, as Dr. Murphy admits, the Multimedia PCA approach is not effective in identifying sources. And this is why Dr. Olsen did not perform a Multimedia PCA analysis in the case at bar.

As explained by Dr. Loftis:

...the multimedia analysis is not appropriate for the IRW study because PCA takes advantage of relationships or correlations among variables, and these relationships will be much different in the solid phase than in the liquid phase. Therefore the chemical signature or fingerprint that PCA is designed to capture will not be preserved from the solid medium to the liquid medium. This is a particular problem in the IRW study because this study includes several different types of water quality variables with widely varying transport properties. The variables include nutrients, basic ions, metals, and bacteria. Some of these variables (such as phosphate and metals) are typically strongly adsorbed to soil and organic matter, and move in both the dissolved and solid phases, while others, such as nitrate, are not adsorbed and move largely in the dissolved phase.

See Exhibit C (Loftis Decl., ¶ 9). Dr. Loftis continues by noting that Dr. Olsen's method of PCA analysis was more appropriate and correct because he only considers one phase at a time:

Dr. Olsen's approach, which considers only one phase (solids or liquids) at a time, is far more appropriate for the IRW system. Olsen's PCA on liquid samples includes the entire fate and transport pathway from the edge of field samples, (which consist largely of runoff from the field and would directly reflect whatever poultry litter impacts occur) to the streams and rivers of the IRW and eventually to Lake Tenkiller. This is a much more logical and coherent approach and one that has been demonstrated in the technical literature for distributed water quality impacts from naturally occurring constituents such as phosphorus.

See Exhibit C (Loftis Decl., ¶ 10).

Additionally, as demonstrated above, Dr. Murphy diverted from his usual PCA approach by simply ignoring important information about sources -- such as the mass balance.

On these facts, Dr. Murphy cannot support Mutlimedia PCA as a reliable methodology for use in this case. Indeed, his own testimony demonstrates the opposite. Accordingly, all of Dr. Murphy's opinions which state or relate to or rely on his Multimedia PCA analysis should be precluded. See Daubert, 509 U.S. at 590.

Similarly, Dr. Murphy seeks to offer an expert opinion that Cargill poultry operations have not contaminated IRW waters. There is a fundamental flaw in Dr. Murphy's method, however: the samples he relies on to support his opinion have not been collected from surface or groundwaters that could reasonably be tied to the land application of waste from Cargill poultry.

See Exhibit B (Murphy Depo., 198:19-199:22, 299:21-300:4 and 301:6 – 302:2). Ignoring common sense, Dr. Murphy did not actually do any analysis to see whether or not poultry waste was applied upstream of the locations about which he opines. Dr. Loftis confirms the obvious flaw in Murphy's foundation for this opinion:

From his deposition testimony, it is apparent that he did not actually do any analysis to see whether or how much poultry litter was applied upstream of these locations. This analysis is essential for an investigator's evaluation of whether waste from a poultry growing operation has impacted a river or stream. Clearly, one must sample locations downgradient (downstream) of fields where there has been land disposal, but Dr. Murphy did not consider this in his analysis.

See Exhibit C (Loftis Decl.¶¶ 15 & 16). Dr. Murphy was attempting to tie the conditions in the stream to land application up gradient at the poultry house without knowing if poultry waste was actually applied next to the house. If one seeks to prove contamination by only looking at select samples, then knowledge of specific land application in relation to those samples is necessary. Because the Cargill Defendants do not know where waste from their turkeys is actually applied, this exercise was based on a spurious premise from the beginning. While most waste is applied near the house, it still may be a few miles away, rendering Dr. Murphy's exercise pointless. This very basic failure is fatal to Dr. Murphy's analysis and any opinion arising out of this flawed analysis should be precluded by the Court.

## IV. Conclusion

WHEREFORE, in light of the foregoing, this Court should enter an order *in limine* precluding the expert testimony of Defendants' witness Brian Murphy with respect to his (1) analysis and opinions derived from his "Multimedia Principle Component Analysis" (Multimedia PCA") and (2) any opinion relating to the Cargill Growers (and waste associated with Cargill operations) not having an impact on the water quality of the IRW.

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I hereby certify that on this 18<sup>th</sup> day of May, 2009, I electronically transmitted the above and foregoing pleading to the Clerk of the Court using the ECF System for filing and a transmittal of a Notice of Electronic Filing to the following ECF registrants:

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